DIAGNOSIS OF WEST NILE VIRUS INFECTION IN ANIMALS

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WNV Surveillance in Dead Corvids

blue jay

Common raven

American crow

Reporting Dead Corvids

- complete the form at www.michigan.gov/westnilevirus/
- if we want to test the bird for WNV, you will be instructed to contact your local health department
- submission kits are available at the LHD and other agencies

DATE OF OBSERVATION: Month | Day | 2003

LOCATION OF OBSERVATION: (see notes)

Zip Code: | Nearest City, Town or Village:

County: Select One | Street Address:

Nearest Crossroads:

ANIMAL(S) OBSERVED:

Class:
- (•) Bird
- ( ) Mammal

Species: (select only one) Select One

If "Unknown," please describe the animal or if "Other," please enter the species:

Number Observed: Select One | Current Status: Select One

Symptoms: (check as many as apply)

- [ ] Eyes crusted
- [ ] Disoriented
- [ ] Tremors
- [ ] Slow Moving
- [ ] Unable to Fly
- [ ] Seizures
- [ ] Eye twitching
- [ ] Malnourished
- [ ] Dehydrated
- [ ] Ruffled Feathers
- [ ] Other (describe):

COMMENTS:

OBSERVER INFORMATION: (see notes)

Name:

Phone: - -

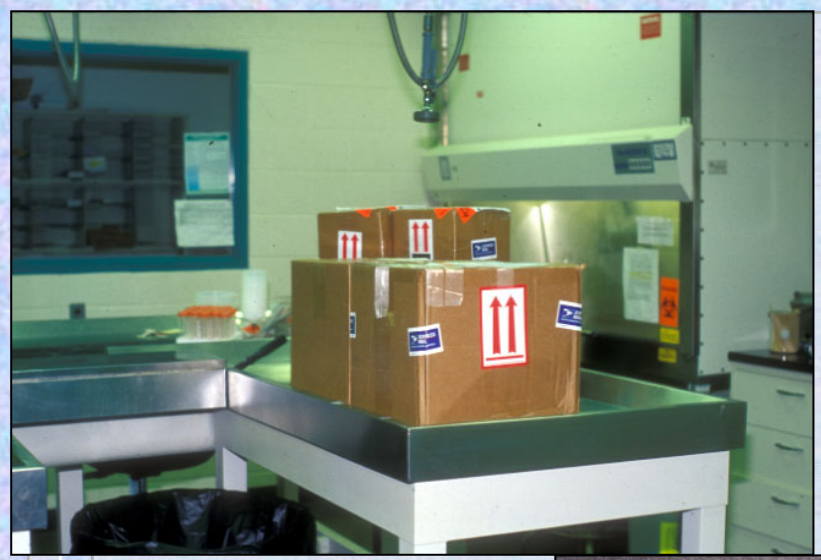
E-mail:

Licensed Rehabilitator or Veterinarian? ( ) No ( ) Yes

Michigan Audubon Member? ( ) No ( ) Yes

Submit | Reset

Submission of Dead Corvids to DCPAH



Submission of Dead Corvids to DCPAH

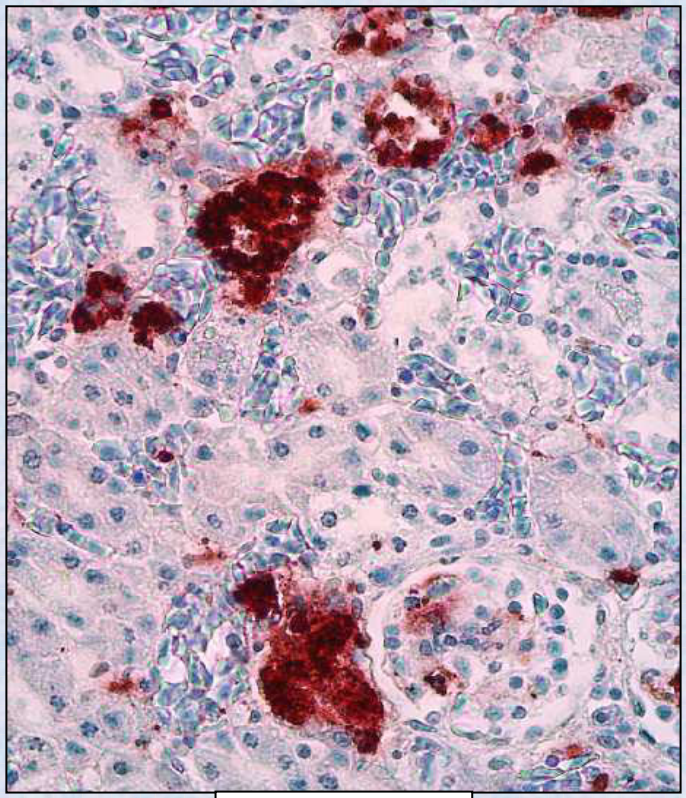
- birds that appear recently dead, with little evidence of decay (i.e., maggots, noxious odor)
- handle birds with disposable rubber/latex gloves
- submission kits provided by MDCH to LHDs and other participating agencies

Testing of Dead Corvids at DCPAH

- collection of heart and kidney tissues
- immunohistochemistry (IHC) for WNV antigen
- PCR confirmation of IHC-positive birds
- testing birds from a given ZIP CODE until one positive bird is confirmed

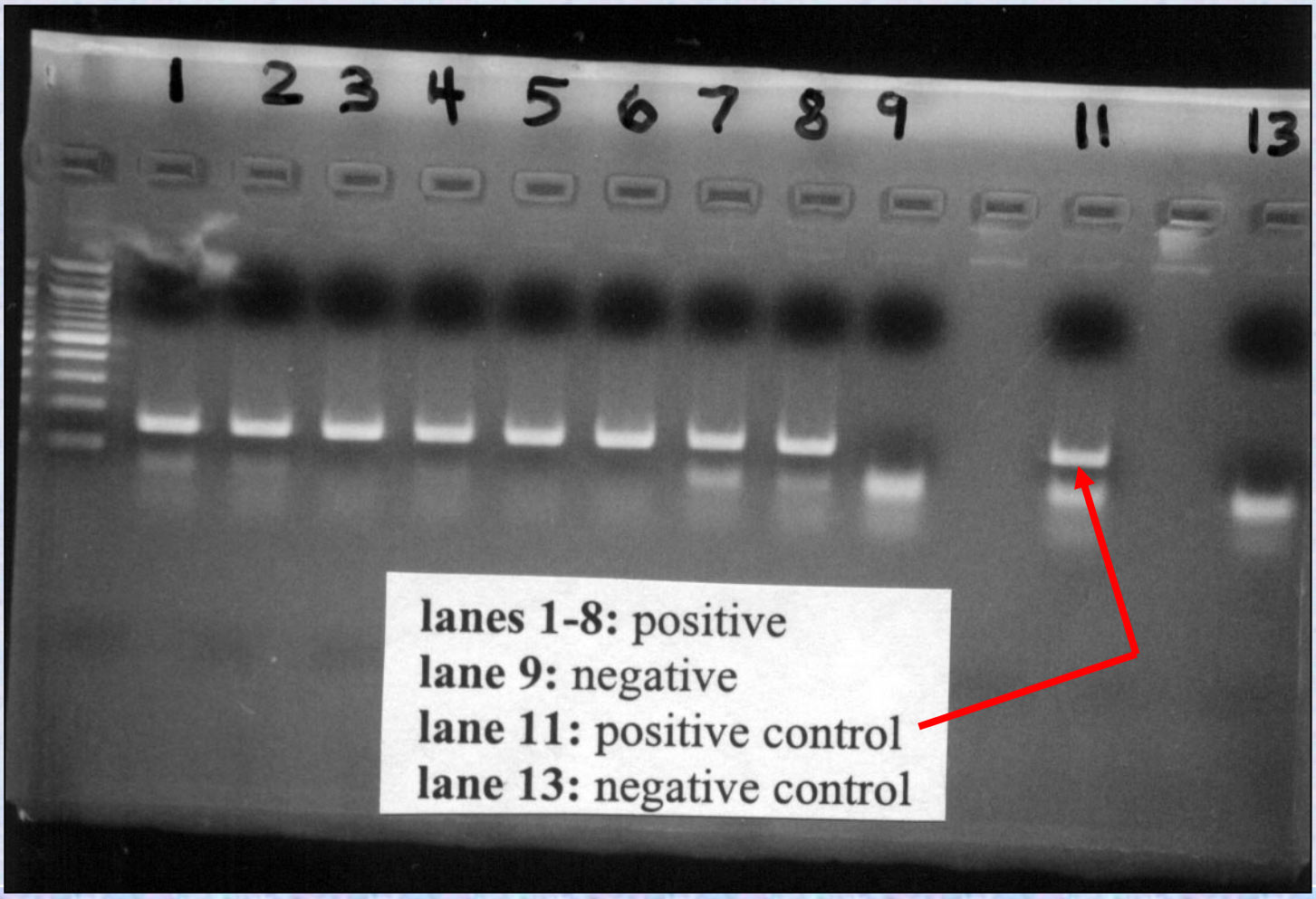
Positive IHC Reactions in Corvids

heart



kidney

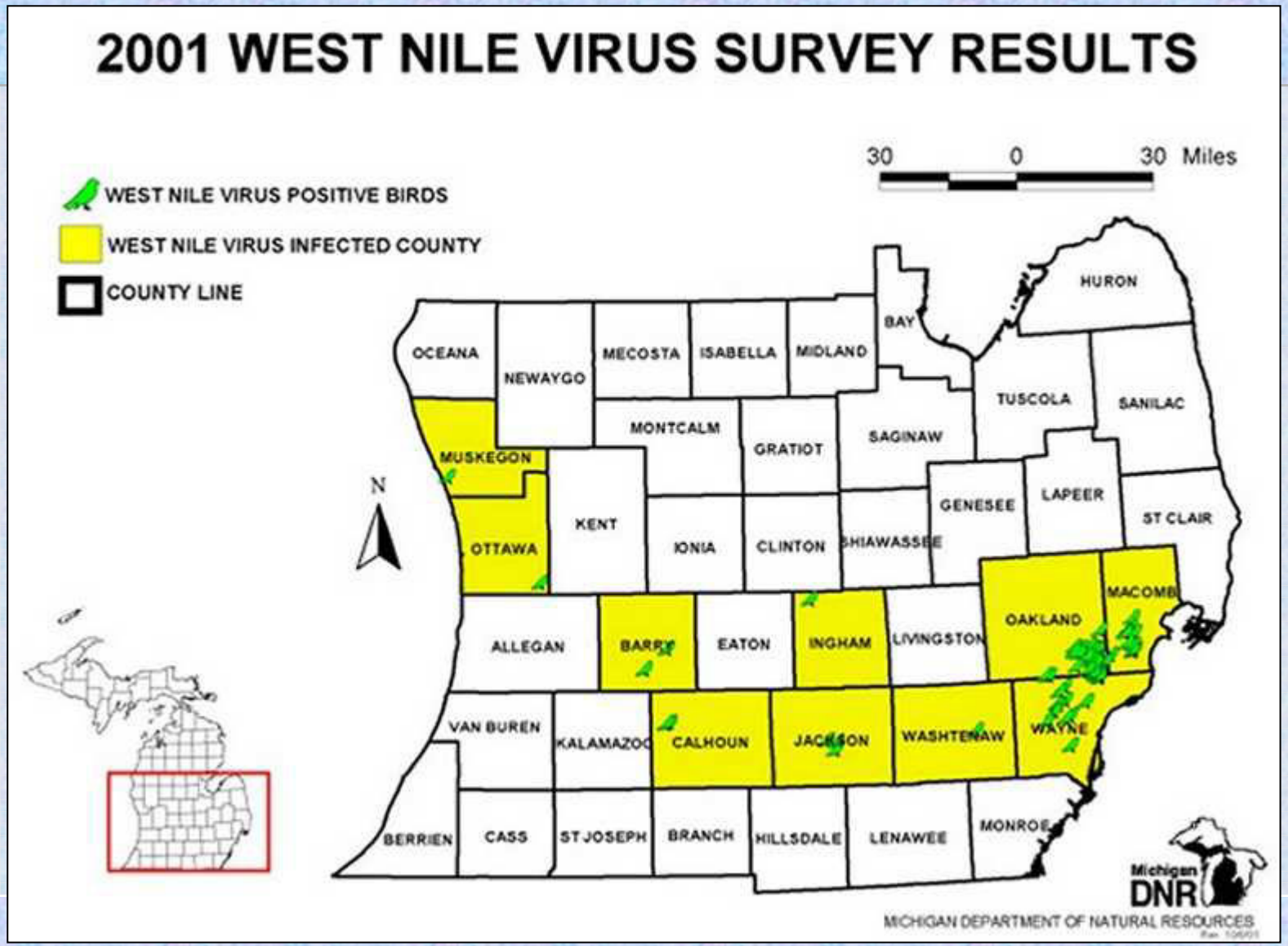
Confirmation of IHC-positive Corvids by RT-PCR



Dead Corvid Data Collection

- timely updating of data at website
- mapping positive birds by zip code
- determining dead corvid density (per square mile)
- determining changes in dead corvid density over time (weekly)

Mapping of Positive Birds - 2001



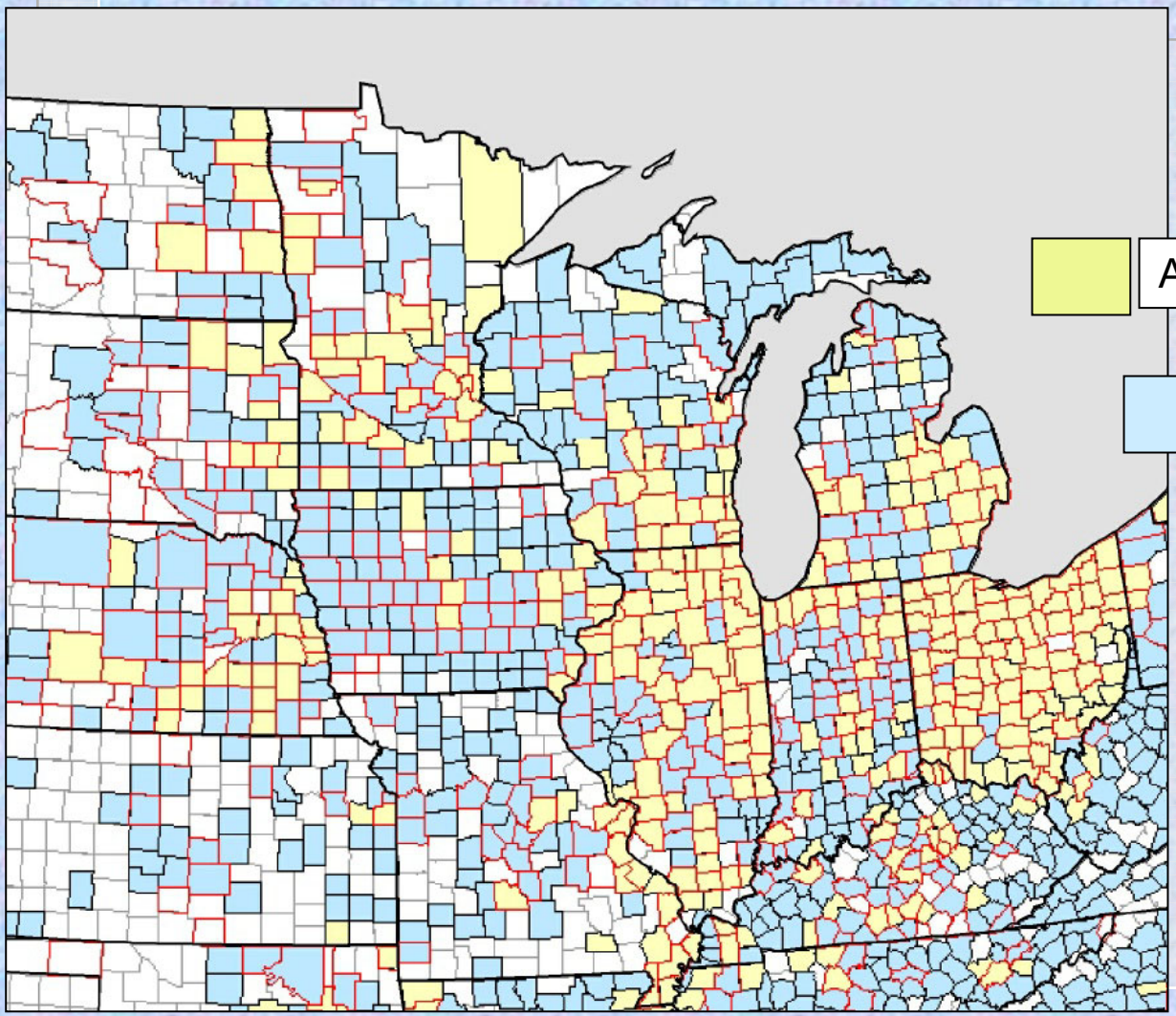
Significance of Dead Corvid Data

- forecast of human WNV risk
- New York study (2000):
  - no human cases in counties with low weekly dead crow densities (< 0.1 per square mile)
  - occasional human cases within a few weeks after counties reported moderate dead crow densities (0.1-1.5 per square mile)
  - outbreak of human cases 2 weeks later in the only county with high dead crow density (>1.5 per square mile)

Significance of Dead Corvid Data

- CDC study (2001 and 2002)
  - calculated relative risk (RR) of human cases in relation to when the first positive bird case was reported
  - The end of week 31 (August 5 or 4) was the pivotal date
  - in 2001, RR = 6.43
  - in 2002, RR = 2.37

Early Avian Deaths Predict Human Illness: North Central U.S., 2002



Avian cases before Wk 32 (8/4)

Avian cases Wk 32 or later

Human cases

RR = 1.77

USGS

WNV Diagnosis in Live Horses

- submission of serum and/or CSF to DCPAH
- completion of "Equine Arbovirus Encephalitis" submittal form

Diagnostic Center for Population and Animal Health

Logo Here

Phone (517) 353-1683

(see reverse side for mailing addresses)

DCPAH Case No._____

MSU Vet. Clin. No._____

2003 Equine Arbovirus Encephalitis

DCPAH Account No._____
Clinic Name _____
Address _____
_____
(city, state, zip)
Veterinarian_____
Phone (___)_____Ext.
Cellular Phone (___) _____ Pager (___) _____
E-Mail Address_____

Owner_____
Address_____
_____
(city, state, zip)
Day Phone (___)_____Evening Phone (___)_____
Cellular/Pager (__)_____FAX (__)_____

CHECK HERE: ☐ ONLY FAX RESULTS (no charge) FAX (___)_____
☐ ONLY HARD COPY RESULTS (no charge)
☐ BOTH FAX AND HARD COPY RESULTS ($3/TRANSMISSION)

SPECIMEN(S) SUBMITTED

Specimen Type: CSF Blood Brain (circle one) Date Specimen Taken_____

Labs other than DCPAH used for testing_____

HORSE INFORMATION

Animal Name
&/or Clinic ID_____ Breed_____ Age____(da.wk.mo.yr.) (circle one) Sex (Male, Gelding, Female) (circle one)
Location Address (if different from owner address)_____
_____
(city, state, zip)
Name of Premises/Farm_____ Barn Contact_____
Phone (___)_____ FAX (___)_____

CLINICAL SIGNS AND HISTORY

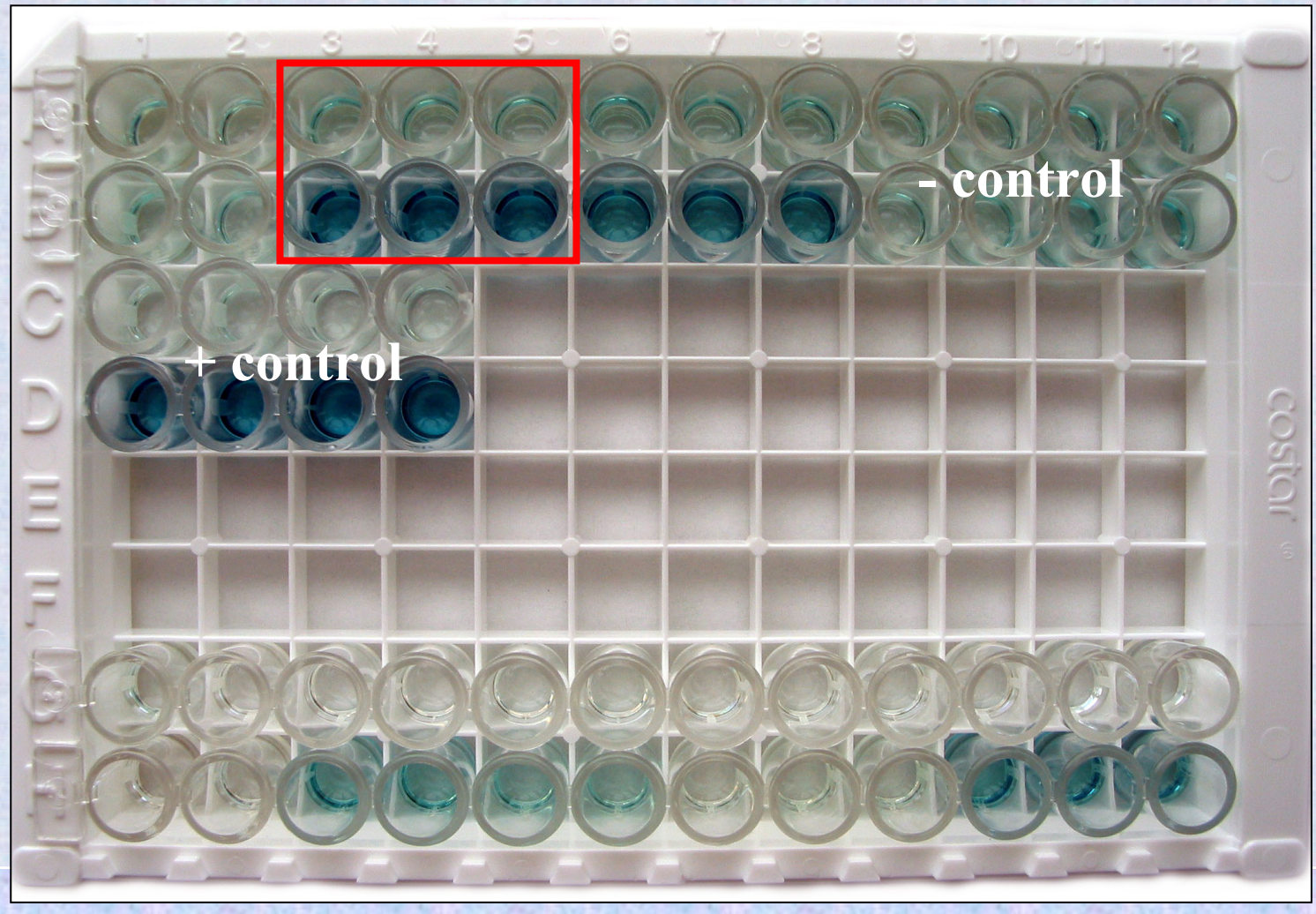
Date of Clinical Sign Onset_____

Clinical Signs (circle):

Apprehension	Depression	Fever
Head Shaking	Listlessness	MuscleTwitches/Fasciculations
Ataxia/Incoordination	Lameness	Recumbency
Weakness of Hind Limbs	Weakness of Front Limbs	Aimless Wandering
Cranial Nerve Paralysis	Anorexia	Head Pressing
Hyperesthesia		

Other signs or details on above information:_____
_____
_____

Serologic Diagnosis in Live Equine Suspects: IgM Capture ELISA



Other Testing of Live Equine Suspects

- IgG ELISA
  - screening test for previous exposure to WNV
  - previously vaccinated or natural exposure
- virus neutralization (VN) test
  - determines viral neutralizing antibody titer

WNV Diagnosis in Dead Horses

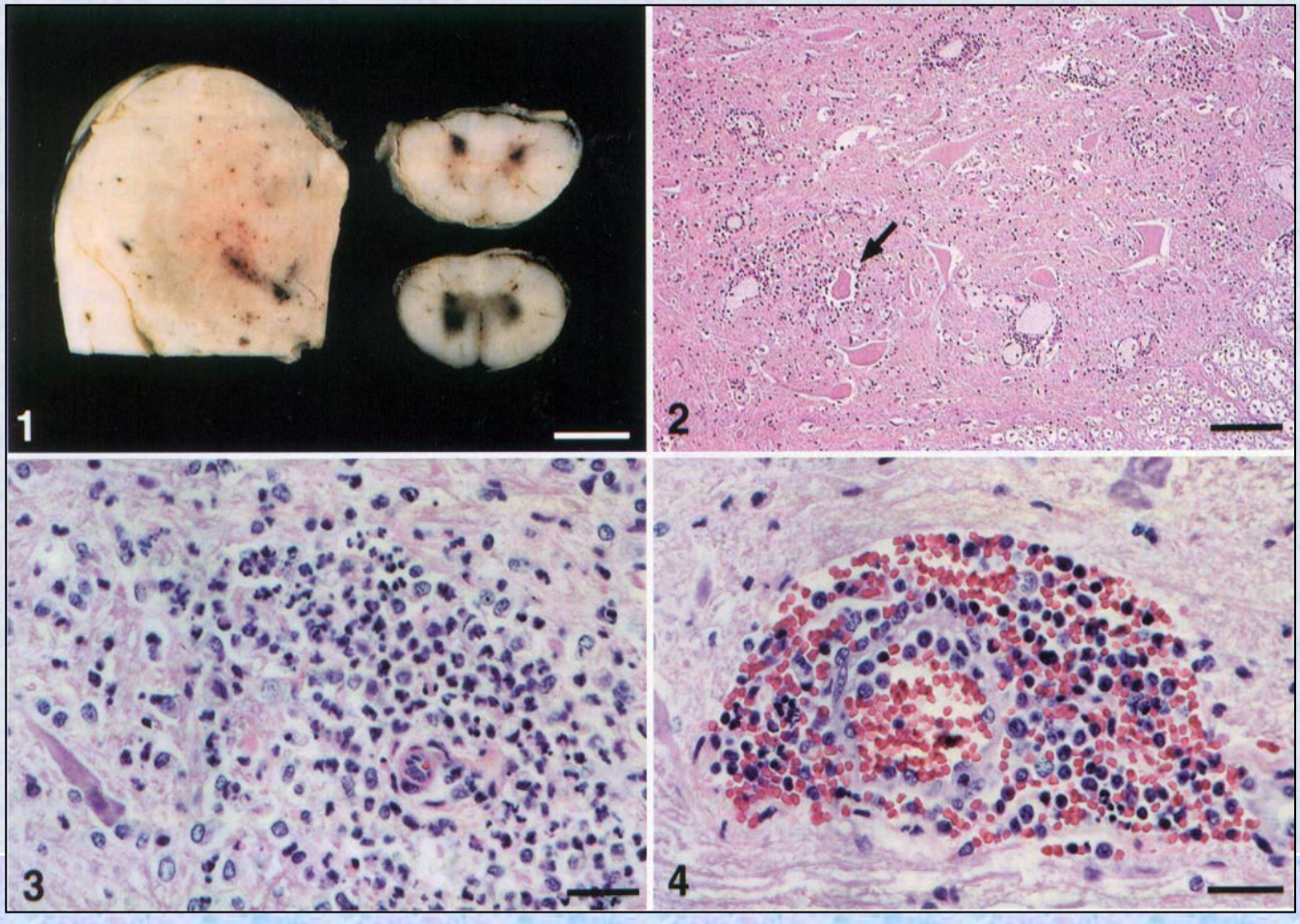
- submission of heads or whole bodies to DCPAH for necropsy
- MDA will arrange for transportation, if necessary

Testing of Dead Horses

- gross necropsy
- rabies testing at MDCH
- CNS histopathology
- IgM capture ELISA on CSF
- IHC for EEE, but not for WNV
- PCR and/or virus isolation

Pathology of WNV Infection in Horses

- encephalitis and/or myelitis, meningitis

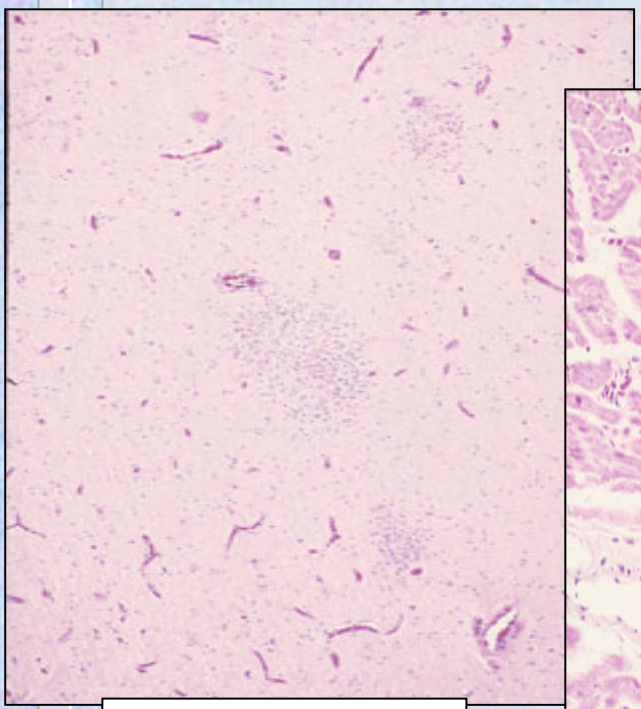


WNV Diagnosis in Dead Non-corvid Birds

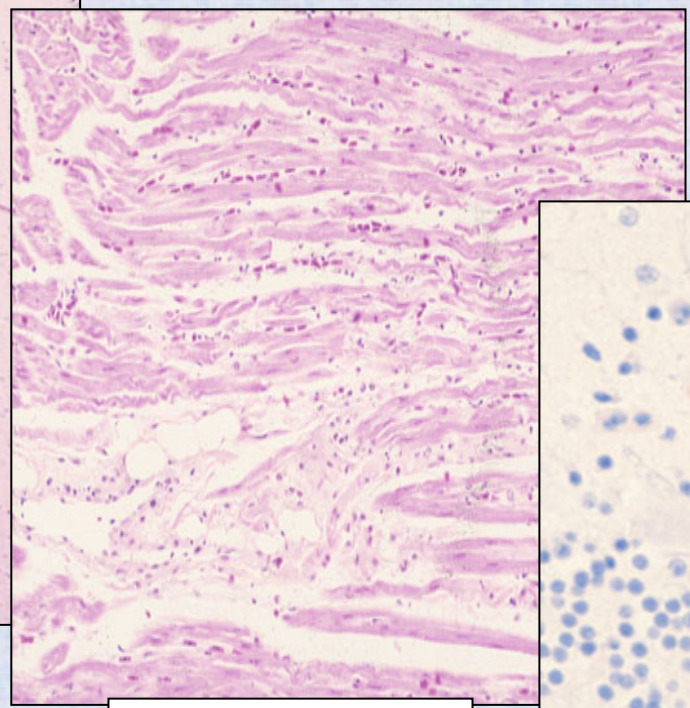
- gross necropsy
- histopathology of all major organs
- IHC on heart, kidney, brain
- confirmation by PCR

Histopathologic and IHC Findings in Non-corvid Birds

- inflammation and viral antigen in multiple organs

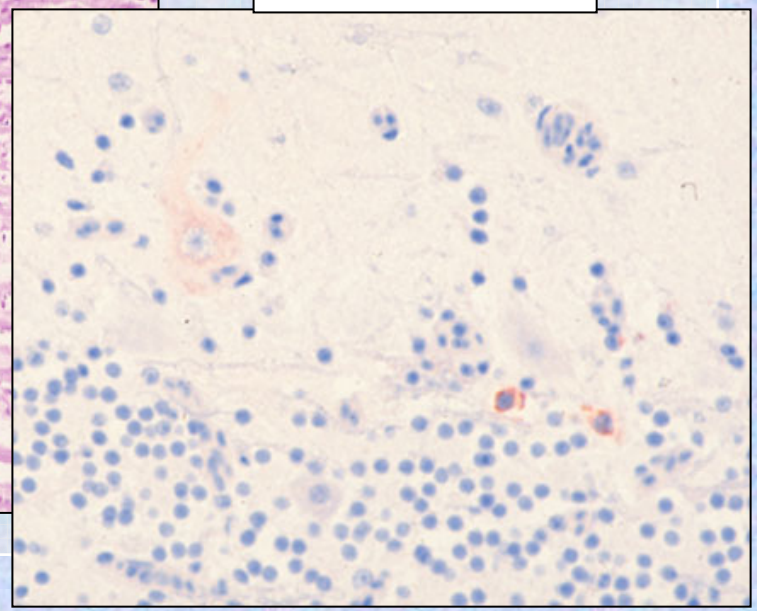


encephalitis



myocarditis

IHC, brain



WNV Infection in Other Animals

- dogs
- cats
- rabbits
- sheep
- alpacas
- llamas
- donkeys
- mules
- mountain goats
- reindeer
- squirrels
- chipmunks
- skunks
- bats
- harbor seals
- alligators

WNV Diagnosis in Other Animals

- **live animals:**
  - IgM capture ELISA for dogs
  - IgG ELISA for dogs
  - VN test on serum from any species
- **dead animals:**
  - gross necropsy
  - histopathology of all major organs
  - IHC on nervous tissue
  - confirmation by PCR